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NOTICE OF ALLOWANCE AND FEE(S) DUE

27076 7590 09/17/2008

DORSEY & WHITNEY LLP
INTELLECTUAL PROPERTY DEPARTMENT
SUITE 3400
1420 FIFTH AVENUE
SEATTLE, WA 98101

EXAMINER

PRINCE, FRED G

ART UNIT

PAPER NUMBER

1797

DATE MAILED: 09/17/2008

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/577,745

04/09/2007

Walter Herding

187743/US

2807

TITLE OF INVENTION: REACTOR AND METHOD FOR ANAEROBIC WASTEWATER TREATMENT

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1440	\$300	\$0	\$1740	12/17/2008

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

27076 7590 09/17/2008

DORSEY & WHITNEY LLP
INTELLECTUAL PROPERTY DEPARTMENT
SUITE 3400
1420 FIFTH AVENUE
SEATTLE, WA 98101

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/577,745	04/09/2007	Walter Herding	187743/US	2807

TITLE OF INVENTION: REACTOR AND METHOD FOR ANAEROBIC WASTEWATER TREATMENT

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1440	\$300	\$0	\$1740	12/17/2008

EXAMINER	ART UNIT	CLASS-SUBCLASS
PRINCE, FRED G	1797	210-603000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
- (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
- 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies _____

4b. Payment of Fee(s); (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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EXAMINER

PRINCE, FRED G

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DATE MAILED: 09/17/2008

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 0 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 0 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice of Allowability	Application No.	Applicant(s)	
	10/577,745	HERDING ET AL.	
	Examiner	Art Unit	
	FRED PRINCE	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to August 26, 2008.
2. ☒ The allowed claim(s) is/are 24-28, 30, 32-42, 44, 49-94 (renumbered as 1-64).
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date <u>0808</u> 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | <ol style="list-style-type: none"> 5. <input type="checkbox"/> Notice of Informal Patent Application 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. 7. <input type="checkbox"/> Examiner's Amendment/Comment 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance 9. <input type="checkbox"/> Other _____. |
|---|--|

/Fred Prince/
Primary Examiner, Art Unit 1797

REASONS FOR ALLOWANCE

1. The following is an examiner's statement of reasons for allowance:

Per claim 24, while it is known in the art to provide a hybrid reactor for anaerobic wastewater treatment comprising a plurality of porous carrier elements occupying at least part of the height of the hybrid reactor; a space in a lower portion of the hybrid reactor between the lower confines thereof and the carrier elements, an upper portion of the hybrid reactor between the upper confines thereof and the carrier elements; a supply line for waste water to be treated and to be introduced into the hybrid reactor for the first time; a discharge system for finally discharging treated waste water from the hybrid reactor, a central flow channel extending from the top of the hybrid reactor in downward direction from a first distance from the upper confines of the reactor to a second distance from the lower confines of the a space between the central flow channel and a wall of the hybrid reactor in which the carrier elements are positioned, the space extending for at least part of the height of the flow channel, the carrier elements forming a structured, ordered fixed bed, to permit flow therethrough, the carrier elements being arranged with flow passages having a predetermined width range between adjacent carrier elements; a separator system located in the upper portion of the hybrid reactor below the discharge system, the separator system being structured to retain microorganisms floating in the waste water in the hybrid reactor and to separate water passed between the carrier elements into a first partial flow flowing into the central flow channel at the top end of the hybrid reactor, and a branched-off second partial flow the hybrid reactor being structured to allow the waste water flow in

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the hybrid reactor in a loop through the central flow channel in downward direction, then through the space in the lower portion, then along the carrier elements in upward direction, and finally again into the central flow channel (see, for example, DE 20021046), in the examiner's opinion, the prior art fails to teach or render obvious; and a recirculation system structured to withdraw water from the second partial flow and recirculate the withdrawn water into the waste water loop flow, the recirculation system including a withdrawal member positioned above a portion of the separator system and at a lower level of the discharge system.

Per claim 42, while it is known in the art to provide a process for anaerobic treatment in a hybrid reactor combining using microorganism pellets and fixed-bed immobilization of microorganisms, in which the waste water to be treated circulates in the hybrid reactor, the process comprising: directing a mixture of the waste water and the microorganism pellets through a space in the lower portion of the hybrid reactor; then directing the mixture of the waste water and the microorganism pellets upwardly in a space of the hybrid reactor, immobilizing microorganisms in the mixture of the waste water and the microorganism pellets using a structured, ordered fixed bed on carrier elements that are porous to permit flow therethrough and form flow passages between each other; then directing the mixture of the waste water and the microorganism pellets to a separator system serving to retain microorganisms floating in the waste water in the hybrid reactor and separating the waste water into a first partial flow and a second partial flow directing the second- first partial flow, centrally in the hybrid reactor from the top in a downward direction back into the space in the lower portion of the hybrid reactor

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(see, for example, DE 20021046) in the examiner's opinion, the prior art fails to teach or render obvious recirculating at least part of the waste water in the second partial flow into the waste water flow in the hybrid reactor.

Per claims 49 and 57, while it is known in the art to provide a hybrid reactor for anaerobic waste water treatment, comprising: a plurality of porous carrier elements occupying at least part of the height of the hybrid reactor; a space in a lower portion of the hybrid reactor between the lower confines thereof and the carrier elements; an upper portion of the hybrid reactor between the upper confines thereof and the carrier elements; a supply line for waste water to be treated and to be introduced into the hybrid reactor for the first time; a discharge system for discharging treated waste water from the hybrid reactor, a central flow channel extending from the top of the hybrid reactor in downward direction from a first distance from the upper confines of the reactor to a second distance from the lower reactor; the hybrid reactor being structured to allow the waste water flow in the hybrid reactor in a loop through the central flow channel in downward direction, then through the space in the lower portion, then along the carrier elements in upward direction, and finally again into the central flow channel; a space between the central flow channel and a wall of the hybrid reactor in which the carrier elements are positioned, the space extending for at least part of the height of the flow channel, the carrier elements forming a structured, ordered fixed bed to permit flow therethrough, and a separator system located in the upper portion of the hybrid reactor below the discharge system, the separator system being structured to retain microorganisms floating in the waste water in the hybrid reactor (see, for example, DE

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20021046), in the examiner's opinion, the prior art fails to teach or render obvious the carrier elements being arranged with flow passages each having a predetermined width range between adjacent carrier elements of 3 to 6 cm or the carrier elements comprising carrier elements substantially of plastics particles and expanded clay particles that are unified with each other.

Per claims 67 and 77, while it is known in the art to provide a plurality of porous carrier elements occupying at least part of the height of the hybrid reactor; a space in a lower portion of the hybrid reactor between the lower confines thereof and the carrier elements; an upper portion of the hybrid reactor between the upper confines thereof and the carrier elements; a supply line for waste water to be treated and to be introduced into the hybrid reactor for the first time; a discharge system for discharging treated waste water from the hybrid reactor, a central flow channel extending from the top of the hybrid reactor in downward direction from a first distance from the upper confines of the reactor to a second distance from the lower reactor; the hybrid reactor being structured to allow the waste water flow in the hybrid reactor in a loop through the central flow channel in downward direction, then through the space in the lower portion, then along the carrier elements in upward direction, and finally again into the central flow channel; a space between the central flow channel and a wall of the hybrid reactor in which the carrier elements are positioned, the space extending for at least part of the height of the flow channel, the carrier elements forming a structured, ordered fixed bed to permit flow therethrough, and a separator system located in the upper portion of the hybrid reactor below the discharge system, the separator system being structured to retain

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microorganisms floating in the waste water in the hybrid reactor (see, for example, DE 20021046), in the examiner's opinion, the prior art fails to teach or render obvious the reactor further including a flow hindrance positioned on the wall of the lower portion of the hybrid reactor or a plurality of different kinds of microorganisms in the form of immobilized microorganisms and microorganism pellets, the microorganisms in the pellets being different from the immobilized microorganisms.

Per claim 87, while it is known in the art to provide a hybrid reactor for anaerobic waste water treatment, comprising: a plurality of microorganism pellets; a plurality of carrier elements occupying at least part of the height of the hybrid reactor for immobilizing microorganisms; a space in a lower portion of the hybrid reactor between the lower confines thereof and the carrier elements to contain the plurality of microorganism pellets for degradation of waste water contamination by the microorganism pellets; an upper portion of the hybrid reactor between the upper confines thereof and the carrier elements; a supply line for waste water to be treated and to be introduced into the hybrid reactor; a discharge system for discharging treated waste water from the hybrid reactor, a central flow channel extending from the top of the hybrid reactor in downward direction from a first distance from the upper confines of the reactor to a second distance from the lower confines of the reactor; the hybrid reactor being structured to allow the waste water flow in the hybrid reactor in a loop through the central flow channel in downward direction, then through the space in the lower portion, then along the carrier elements in upward direction, and finally again into the central flow channel; the carrier elements positioned in an annular space between the central

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flow channel and a wall of the hybrid reactor for at least part of the height of the flow channel for immobilizing microorganisms, the carrier elements comprising a structured, ordered fixed porous bed to permit flow therethrough, the carrier elements being arranged with flow passages having a predetermined width range between adjacent carrier elements; a separator system located in the upper portion of the hybrid reactor below the discharge system to retain the microorganisms floating in the waste water in the hybrid reactor; the waste water inclusive of the microorganism pellets flowing in the hybrid reactor in a loop through the central flow channel in downward direction, then through the space in the lower portion, then along the carrier elements in upward direction and finally again into the central flow channel (see, for example, DE 20021046), in the examiner's opinion, the prior art fails to teach or render obvious the reactor further comprising a recirculation system structured to withdraw water from the second partial flow and recirculate the withdrawn water into the waste water loop flow, the recirculation system including a withdrawal member positioned above a portion of the separator system and at a lower level of the discharge system.

2. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to FRED PRINCE whose telephone number is (571)272-

Art Unit: 1797

1165. The examiner can normally be reached on Monday-Thursday, 6:30-4:00; alt. Fridays 6:30-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on (571) 272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Fred Prince/
Primary Examiner, Art Unit 1797

fgp
9/9/08